MARINER NEWS

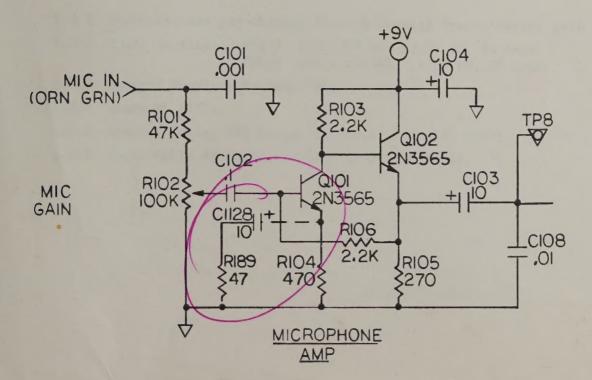
TO: Service Departments

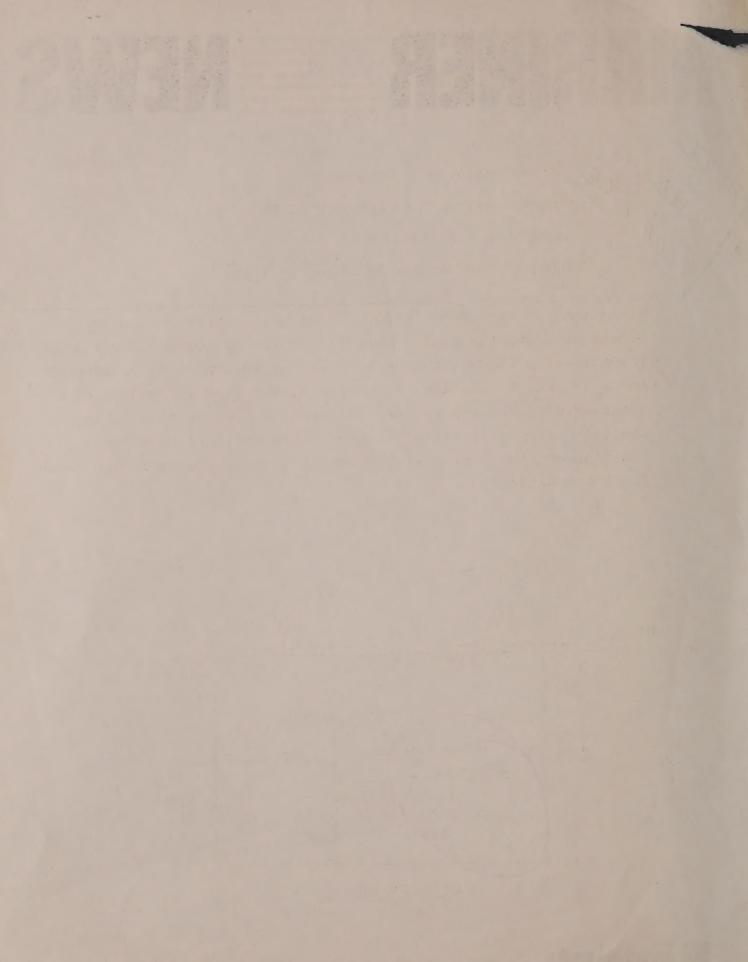
FROM: Walter E. Kaelin, V.P. Engineering

DATE: April 14, 1978

SUBJECT: Mariner 500 Microphone Circuit

Variations in microphone output voltage and operators voice demand occasionally higher output from the microphone amplifier. The following circuit change will result in improved performance. Add a 47 Ohm, $\frac{1}{4}$ Watt 10%, in series with a 10 μ F 16V capacitor across R104. These parts are soldered on the top side of the circuit board. All radios shipped since April 12 have been modified at the plant. Please let me know if you need components for the modification.





1. GENERAL INFORMATION

1.1 DESCRIPTION

The Mariner 1600 is a compact, all solid-state, 150W PEP, HF SSB Transceiver for the Marine and HF Radio Service.

The set covers the frequency range from 2 to 23MHz with no frequency restrictions on receive or transmit. The channel capacity is 12 semiduplex or 24 simplex or any combination. The upper sideband is transmitted. The channel frequencies are controlled by precision crystals that are housed in a proportional controlled crystal oven. Programming of each channel is accomplished with slide switches. A separate filter is used to allow true AM reception on so programmed channels. The transceiver works off a 12V DC negative ground system. The RF impedance is 50 ohms and is compatible with the Mariner 1605 Antenna Coupler or trap antennas.

1.2 EQUIPMENT FURNISHED

- 1.2.1 Mariner 1600 Radiotelephone.
- 1.2.2 Microphone and Microphone Clip.
- 1.2.3 Mounting Bracket.
- 1.2.4 6-Pin Power Connector (P/N 1430 5039).
- 1.2.5 18-Pin Control Connector to Antenna Coupler (P/N 1430 5038).
- 1.2.6 Instruction and Maintenance Manual.
- 1.2.7 Sheet of Frequency Markers (P/N 5315 7037).

1.3 OPTIONS AND ACCESSORIES

- 1.3.1 Crystals, one per channel (Intech Crystal Specification 1616 XXXX).
- 1.3.2 Power Supplies: PS135 115/220V AC, 13.6V DC, 20 Amps PS136 20 to 50V DC, 13.6V DC, 20 Amps
- 1.3.3 Antenna Coupler, Mariner 1605.
- 1.3.4 Handset, H177.
- 1.3.5 Control Cable, #22 Gauge, 20 Wires (P/N 3640 0007).
- 1.3.6 Power Cable #8 Gauge, 2 Wires (P/N 3640 0006).

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1.4 MECHANICAL INFORMATION

Size: 40.6cm W x 14cm H x 35.6cm D 16" W x 5.5" H x 14" D

Weight: 8.2 kgs. or 18 lbs.

Mounting Position: Any Orientation

1.5 ELECTRICAL SPECIFICATION

1.5.1 GENERAL

Type Acceptance FCC Parts 81, 83, 89, 91

Frequency Range 2 to 23MHz

Circuitry Dual Conversion (45MHz, 455kHz)

Channel Capacity 24 Simplex or 12 Semi-duplex or

any combination.

Front Panel Controls Volume ON/OFF, Clarifier, Squelch/RF

Gain, AM/SSB, A/B Channel, Channel

Selector.

Operating Temperature Range -30 to +60°C

Frequency Stability 20Hz

Operating Modes A3A, (SSB -16dB Carrier)

A3H, (AME -3 to -6dB Carrier)

A3J, (SSB -40dB Carrier)

Primary Voltage 13.6V DC ±15%, Negative Ground

Current Drain

Receive Standby 1A
Receive Full Audio 1.5A
Transmit Average Voice 10A

Transmit Two Tone 18A

RF Impedance 50 Ohms

1.5.2 TRANSMITTER

Power Output (into 50 Ohms)

A3A, A3J, 150W PEP
A3H

40W PEP

AJII 40W II

Intermodulation -32dB below PEP

Spurious Emmissions -64dB below PEP

Carrier Supression -46dB below PEP (A3J)

Undesired Sideband Supression -60dB below PEP

Audio Response 300Hz to 2400Hz, ±3dB

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1.5.3 RECEIVER

Sensitivity: SSB

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Selectivity: SSB

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AGC

 $1\mu V$ for 12dB SINAD, 500mV Audio $3\mu V$ for 12dB SINAD, 500mV Audio

-6dB 300Hz to 2400Hz, -60dB @ 4kHz

-6dB @ ±6kHz, -60dB @ ±16kHz

Audio output varies less than 10dB for

signals between $10\mu V$ and 100mV, fast

attack, slow release.

Intermodulation At least -80dB

Spurious Responses (indl. Image) At least -60dB

Clarifier, uniform on all channels ±150Hz

Noise Limiter Diodes

Audio Power 4 watts at less than 10% distortion

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2 OPERATION

2.1 WARM-UP CAUTION

Do not attempt to transmit until the radiotelephone is warmed-up for at least 10 minutes. Transmitting before the 10 minute warm-up period has elapsed can cause a violation of FCC Regulations.

2.2 FCC REQUIREMENTS

Before a SSB radiotelephone can be licensed, a VHF radio set has to be installed. A valid ship station license, in addition to an operators license, is required to operate a radiotelephone. FCC forms #502 and #753A can be obtained from an Intech dealer or direct from the factory. Aliens can obtain form #755 from the nearest FCC office.

2.3 OPERATING PRACTICES, FCC PARTS 81 AND 83

"How to Correctly Operate Your Radio Telephone Set" is a booklet available from the Radio Technical Commission for Marine Service (RTCM), P.O. Box 19087, Washington, D.C. 20036 and is highly recommended reading material.

2.4 FRONT PANEL CONTROLS AND INDICATORS

Figure 1 illustrates the front panel of the Mariner 1600. The function of these controls are as follows:

<u>Volume/Off:</u> This control adjusts the loudness of the receiver and turns the set on and off. To turn the set ON, turn the Volume/Off control knob CLOCKWISE until a click is heard. Turning the control knob further clockwise will increase the receiver volume level.

Clarity/Lamp: This control varies the frequency of the receiver ±150Hz to allow the operator to compensate for off-frequency signals. When the control is set to mid-range, the frequency of the receiver is approximately correct for that channel. The lamp control is a pull type switch on the clarity control knob which allows the operator to actuate a small panel lamp behind the channel frequency placard. To actuate the lamp, pull the clarity/lamp control knob out.

Squelch/RF Gain: This potentiometer sets the squelch threshold in the push-in position. With the control in the pull-out mode, the RF gain level can be set.

Note: At any one time only one of these functions can be exercised.

AM/SSB Switch: Allows the operator to receive AM or SSB on a A3H(AME) Channel. 2182 is the only legal A3H Channel in the U.S.

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AME/SSB Switch: This control allows the operator to manually select either AME or SSB on any channel WHEN SUCH OPERATION IS INTERNALLY PROGRAMMED. This control is intended for those frequencies where both AM and SSB modes are allowed.

A/B Switch: This control is used to obtain two frequencies on one position of the channel selector. It is only operational when the channel is internally programmed for simplex operation.

Channel Selector: Used to select desired operating frequency.

Frequency Display: Indicates the station (i.e., WOO 4-1) or frequencies associated with a particular selector position.

A Green and Yellow LED show whether the A or B frequency is in use on a particular switch position.

A Red Lamp behind the dial indicates that power has been applied to the transmit circuits.

Illumination for the window is provided by a light bulb activated by pulling the clarifier knob.

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2.5 PROPAGATION

HF signals do propagate for beyond the horizon. MF frequencies (2-3MHz) are generally usable within 300 miles depending on the daytime, atmospheric and man-made noise.

The High-Seas frequencies (4, 6, 8, 12, 16, 22MHz bands) allow communications over thousands of miles, again subject to the above mentioned limitations. Interference tends to be more of a problem than on VHF.

2.6 OPERATING THE TRANSMITTER

The operation of the transmitter is fairly straight forward. Do not shout into the microphone as it will decrease intelligiblity. Acknowledgement of a message cannot be done by keying the microphone since no signal is transmitted until the operator actually speaks.

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